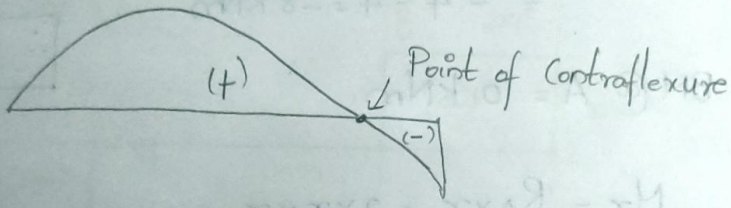
$BM @ E = (50 \times 5) + (-40 \times 1) + (-10 \times 0.5)$

$= 250 - 40 - 5$

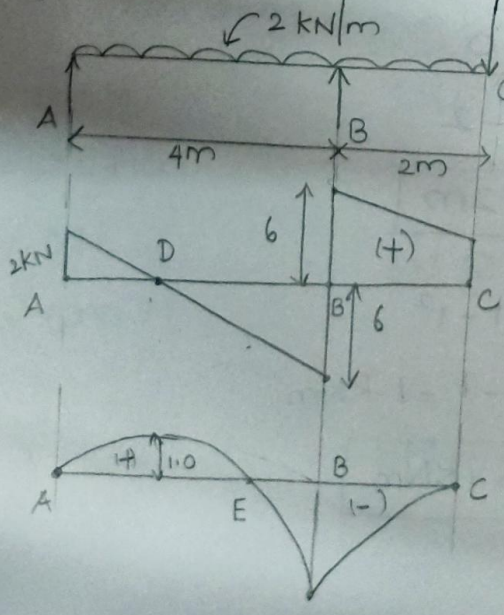
$= 205$ kNm.

Point of Contraflexure:

A Point of Contraflexure is a point where the curvature of the Beam changes Sign. It is also called as the Point of Inflexion.




1) Draw the SF & BM Diagrams for the Overhanging Beam carrying Uniformly Distributed Load of 2kN/m over entire Length & the Point Load of 2 kN as shown in fig. Locate the Point of Contraflexure



SF @ A = 2 − 12 + 12 − 2

= 0 kN

SF @ C = 2 kN

SF @ B = 2 − 12 + 4

= −6 kN

BM @ C = 0 kNm

BM @ B = (−2 × 2) + (−4 × 1)

= −4 − 4 = −8 kNm.

BM @ A = 0 kNm.

$M_x = R_A \times x - 2 \times x \times \frac{x}{2}$

$= 2x - x^2$

$M_x = 0$

$0 = 2x - x^2$

$0 = x(2 - x)$

$2 - x = 0$

$-x = -2$

$\boxed{x = 2m}$

$M_D = 2 \times 1 - 1^2$

$= 2 - 1 = 1$ kNm

$\boxed{M_D = 1 \text{ kNm}}$

$(R_B \times 4) - (2 \times 6) - (12 \times 3) = 0$

$4R_B - 12 - 36 = 0$

$4R_B - 48 = 0$

$R_B = \frac{48}{4} = 12$ kN

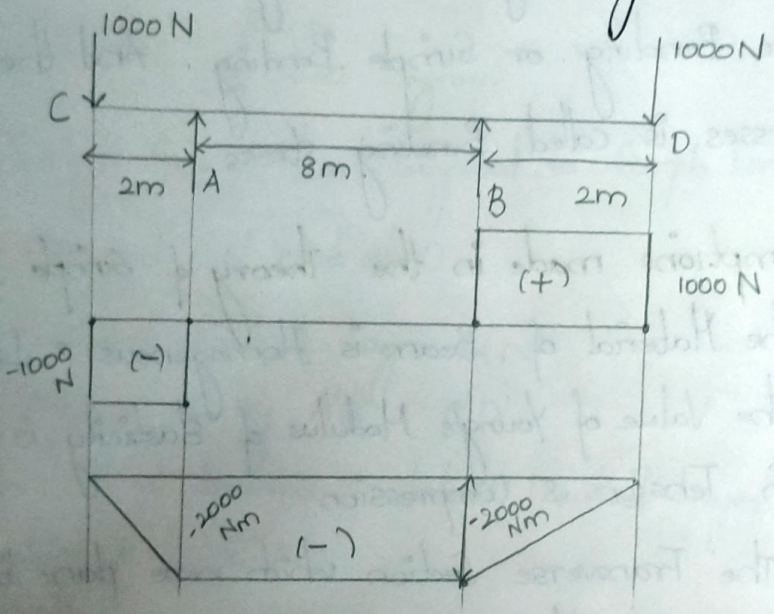
$\boxed{R_B = 12 \text{ kN}}$

$R_A + R_B = 2 + 12$

$= 14$ kN

$\therefore \boxed{R_A = 2 \text{ kN}}$

2) A Beam of Length 12m is Simply Supported at two Supports which are 8m Apart, with an Overhang of 2m on each side as shown in Fig. the Beam carries a Concentrated Load of 1000N at each end. Draw SF & BM Diagrams.




Sol: As Symmetrical Section, $R_A = R_B$

$$R_A = R_B = \frac{2000}{2} = 1000 \text{ kN}$$

SF@D = 1000 N

SF@B = 1000 ~~+~~ 1000 = 0 N

SF@C = 0 N

SF@A = -1000 N

BM@D = 0 Nm

BM@B = -1000 x 2
= -2000 Nm

BM@A = (-1000 x 10)
+ (1000 x 8)
= -2000 Nm

BM@C = (-1000 x 12)
+ (1000 x 10)
+ (1000 x 2)
= 0 Nm